F-587- 01 Express Mail Label No.: EU803550967US

STATEMENT LEVEL TRACKING IN A DOCUMENT PRODUCTION AND MANAGEMENT PROCESS

This application claims priority under 35 U.S.C. § 119(e) from United States Provisional Application 60/421,230, of the same title, dated October 25, 2002, which is hereby incorporated by reference in its entirety.

Technical Field

The present invention relates to a system for monitoring and controlling document production equipment and systems. Such equipment and systems may include high volume printers, inserter machines, mail sorting machines, and the like. The present invention also relates to tracking of mail pieces during delivery by a carrier service.

Background

Systems for mass producing mail pieces are well known in the art. Such systems are typically used by organizations such as banks, insurance companies and utility companies for producing a large volume of specific mailings like billing statements, or promotional offers. The starting point for the document production process is a stream of print data generated by the organization wishing to create the mailing. The print streams are usually produced by older, legacy, computer

systems that are not easily adapted to do more than provide raw print data that is output as a result of the legacy computer systems' business logic.

The raw print stream data may be manipulated using known print stream manipulation software, such as the Streamweaver™ product of Pitney Bowes Inc. Print stream manipulation software allows users to change the look and content of documents, without requiring changes to the legacy computer systems.

Once print stream manipulation is complete, the print stream may be sent to a high volume printer. Such high volume printing results in large rolls or stacks of documents, usually connected in a continuous web. The webs of documents are transported to an inserter machine to be separated into individual pages and turned into mail pieces. Examples of such inserter systems are the 8 series, 9 series, and APS™ inserter systems available from Pitney Bowes Inc. of Stamford Connecticut.

In many respects the typical inserter system resembles a manufacturing assembly line. Sheets and other raw materials (other sheets, enclosures, and envelopes) enter the inserter system as inputs. A plurality of different modules or workstations in the inserter system work cooperatively to process the sheets until a finished mail piece is produced. The exact configuration of each inserter system depends upon the needs of the particular customer or installation.

Typically, inserter systems prepare mail pieces by gathering collations of documents on a conveyor. The collations are then transported on the conveyor to

an insertion station where they are automatically stuffed into envelopes. After being stuffed with the collations, the envelopes are removed from the insertion station for further processing. Such further processing may include automated closing and sealing the envelope flap, weighing the envelope, applying postage to the envelope, and finally sorting and stacking the envelopes.

Each collation of documents processed by the inserter system typically includes a control document having coded control marks printed thereon. Scanners are located throughout the inserter system to sense documents and to allow control for processing of a particular mail piece. The coded marks may be bar codes, UPC code, or the like.

The inserter system control system is coupled to the inserter system's modular components. The control system stores data files identifying how individual mail pieces should be processed. These data files are typically linked to individual mail pieces by the coded marks included on the control documents. As a collation passes through the inserter system, the coded marks on the control document are scanned and the control system directs the modular components to assemble the mail piece as appropriate. Mail pieces such as billing statements will often include a reply document and/or a return envelope that is pre-addressed for delivery back to the originator of the mail piece. Such reply documents and return envelopes may be used to send back payments, or acceptances of offers, or the like.

Once a finished mail piece has been formed by the inserter system, it may be stacked and provided to a carrier service, such as the U.S. Postal Service, for delivery. Often, in order to receive postal discounts, it is advantageous to sort the outgoing mail in accordance postal regulations. Such output sorting devices are well known. Examples of output sorting devices are available from MailCode, Inc.

In delivering documents to their recipients, a number of carriers provide means for tracking the progress of the mail piece. For example, Federal Express and UPS provide tracking capabilities that may be monitored by senders via the Internet. In a similar manner, the U.S. Postal Service can provide PLANET codes on mail pieces which allow for tracking of the mail pieces in the mail stream.

When reply mail pieces are sent back from the recipient to the originator, the reply mail pieces are sorted with an incoming sorter. The incoming sorter can sort incoming mail pieces into bundles to be handled by the same group within the organization. The incoming sorters may also include scanning capabilities to determine if an incoming mail piece is a return mail piece, and such return mail piece may also be sorted accordingly for appropriate handling.

At the various stages of the mail production and management process, sensing devices are in place to help identify the occurrence of errors and mishandling. When an error is found within a stage, the systems typically provide for notification of errors so that corrective action may be taken. Information on processing performance is often provided to local operators.

A goal of mail production equipment and processes is to quickly and efficiently provide a large quantity of mail communications to many different recipients. One known technique for enhancing efficiency is to determine whether more than one communication is being sent from the mailer to any given address. For example, if different family members in the same household had separate bank accounts, the bank might be able to decrease the number of mailings by sending all of the families statements to their address in one envelope. This technique of consolidating communications to a common address is referred to as "householding." Householding may also include multiple communications to the same person in the household. For instance, if there are two insurance claims outstanding and instead of sending the resolution and check for each claim in separate envelopes, the insurance company could save postage by sending both in one envelope

Typically, householding consolidation algorithms are carried out in the creation of the print streams and mail piece definitions that are later utilized by the mail production equipment to create the mail pieces. Thus, one mail piece, as defined to the inserter equipment, may in fact include multiple transactional communications.

Summary of th Invention

A technique for monitoring and tracking mail pieces can be very valuable to organizations that use large quantities of mail to reach their business customers. The information gathered can be helpful for at least two purposes.

First, the organization is interested in overseeing the speed, efficiency and accuracy of the mail production process. Second, the organization may be interested in managing the relationship communication, sometimes a transaction, embodied in the contents of the mail pieces. In a system that uses the present invention, much of the information that is gathered for monitoring the production process may also be helpful for monitoring the status of the relationship communication.

One circumstance where gathered information used for the first and second purposes may be different is when the mailer is using householding techniques to consolidate mail that is being sent to a given address. In that situation, there may be more than one transaction communication in a given mail piece, and simply looking at mail piece status will not differentiate the transactions. Accordingly, the present invention provides a more robust means to distinguish and monitor the status of individual transaction communications, in addition to monitoring production status of mail pieces. The invention is particularly useful in situations where the mailer is using householding techniques.

To assist in these goals, the present invention utilizes information gathered at the various mail creation and delivery stages. Using mail piece information, mailers can better plan their mailing tasks and provide better responsiveness to customer inquiries. For example, an inserter control system collects data about the efficiency and functioning of the inserter system. Such a control system can monitor and keep statistics about the speed at which the system is operating, and the rate of errors that occur. Such monitoring may utilize data from tracking mail piece control documents through the inserter system. Additional sensors may also be used to provide further independent information. Optical sensors and scanners may be located at input and output locations for the inserter systems to further monitor and record data concerning documents within the inserter processing stage. Information about documents and mail pieces gathered at multiple stages in the mail production and management process is preferably provided to a centralized location, to provide the greatest capability for planning, coordination and analysis.

If a billing statement for a particular customer was of interest to the organization, a system according to the present invention would allow the status of that statement to be determined within the system. If the billing statement is not part of a household consolidated mail piece, then the majority of the relevant information may be found by looking at the mail piece information. However, if the mail piece includes multiple statements, then a further layer of distinction is

necessary. Accordingly, a unique communication ID, or invoice ID, is needed. Such communication ID would be linked to the mail piece information.

Preferably, the system can also relate reply mail pieces, returned from the customer, back to the original outgoing mail piece. This allows closed loop tracking of the entire cycle of communication represented by the mail piece. Real time monitoring of individual mail pieces, and the corresponding communications therein, allows real time responsive actions (such as reprint, customer communications and notifications) based on mail piece status changes throughout the mail production process. Document lifecycle tracking also tracks the document through delivery, receipt and responses received pursuant to the produced document.

The system of the present invention uses the identity of the individual communications and mail pieces for tracking throughout the processes. Content of the documents may be viewed by a remote operator at each stage in the document production system and the operator may take appropriate fulfillment action based on tracking of incoming replies. Documents may be identified either by mail piece or by the individual communications that may be included in the mail pieces.

Preferably, in accordance with the present invention, a mail piece data file is created that defines content and assembly instructions for a mail piece. In parallel with the mail piece data file, a communication data file is created. At a

minimum, the communications data file will include a listing of which mail piece each communication belongs to, thereby linking the two files.

Further details of the present invention are provided in the accompanying detailed description, figures and claims.

Summary of the Figures

Figure 1 is a high level depiction of a mail piece lifecycle and a system for monitoring documents within that lifecycle.

Figure 2 is an exemplary system for implementing the present invention.

Figure 3 is an exemplary arrangement of document status sensing devices for use with an inserter system.

Figure 4 is an exemplary display of mail piece status using the present invention.

Figure 5 is an exemplary mail piece status display with a status filter applied.

Figure 6 is an exemplary display of extended information for a selected mail piece.

Figure 7 depicts a preferred embodiment for selecting a document lifecycle process stage for closer investigation.

Figure 8 depicts an exemplary use of communication level information.

Detail d D scription

An overview of the present invention may be understood in reference to Fig. 1. A lifecycle monitoring system **1** serves as a gathering point for document information from the closed loop lifecycle of mail piece communications. Much of the information regarding status of the documents comes from the same system that oversees creation of the documents and mail pieces. Thus, the mailpiece creation system **2** typically includes document print stream information, mail piece creation instructions, and information on the status of documents within the mail production equipment. All such information is of interest and is passed to the lifecycle monitoring system **1**. The mail piece creation system **2** receives document and mail piece information from the various mail production stages including document creation **10**, document enhancement **20**, printing **30**, inserting **30**, and outgoing sorting **50**. Information from later stages of the mail piece lifecycle are provided to the lifecycle monitoring system **1** via a mail piece tracking and tracing system **3**. Known systems for tracking mail pieces within the carriers' delivery systems are used to gather information during the carrier service deliver stage **60**.

After the document recipient **70** has received the mail communication a reply mail piece is put back into the mail stream for delivery back to the sender via the carrier service in the reply delivery stage **80**. Typically, such reply mail pieces are provided to the recipient **70** as a reply envelope or card included within the

original mail piece. Such pre-prepared reply mail pieces are marked with codes so that they too may be tracked in the during the reply delivery stage **80**. When the reply mail piece is received at the original sender, it undergoes an incoming sorting stage **90** where documents are sorted and prioritized for internal processing.

The incoming sorting stage preferably includes sensors for scanning the codes on the incoming reply mail pieces for identifying the mail piece and relating it back to the original correspondence that was sent out. As depicted in Fig. 1, the information gathered from the incoming sorting stage **90** is provided through the mail piece track and trace system **3** to the lifecycle monitoring system **1**. Alternatively, the incoming sorting stage **90** may send data directly to the lifecycle monitoring system **1**, or through an alternate subsystem, such as the creation system **2**.

An exemplary carrier service for stages **60** and **90** is the U.S. Postal Service. Using the USPS, PLANET barcodes provide unique identifier information, which is relayed by the USPS automatically to the mailer so that the document tracking process continues even after the mail piece has left the mailer's facilities. As mail pieces arrive at different locations in the USPS system, a party using the lifecycle tracking system **1** can prepare for acting upon reply communications. Since all of the mail pieces are uniquely identified, effectiveness

of the mailings (such as advertisement campaigns) can be measured and analyzed in real time.

In the preferred embodiment, during each of the lifecycle stages the communication or mail piece, as it exists during that stage, is related back to a common identifier and a common record in the lifecycle monitoring system **1**. The common identifier is preferably unique, although reasonably non-recurring identifiers also suffice. Identifiers may be a number, a name, or any kind of alphanumeric string. Thus, for example, a printed document in print stage **30**, a finished sorted mail piece at sort stage **50**, and a reply envelope during return delivery stage **80**, will all be marked so that they may be identified, and such marks will all link back to the common identifier and record in the lifecycle monitoring system **1**. During the various stages it may be necessary that the marks themselves be different to satisfy the respective sensing systems at the various stages. However, the life cycle monitoring system **1** relates the varied marks back to the single common identifier and record.

In the preferred embodiment of the present invention, in addition to each mail piece having a unique identifier, each communication within a mail piece also has a unique identifier. A communication data file includes information that is specific to a particular transaction when the mail piece may include more than one statement or invoice. Each communication data file includes a reference to the corresponding mail piece identifier so that the corresponding mail piece

information may be retrieved. Thus a user of the life cycle monitoring system **1** may submit inquiries based on either mail piece, or the individual communication, and be able to retrieve full lifecycle status and information. Preferably, the user need not know the particular mail piece information when performing a query relating to an individual communication. The mail piece and the individual communications are linked in the corresponding data files.

In Fig. 2, a system for implementing life cycle monitoring system **1** is depicted. Monitoring and control of lifecycle monitoring is preferably handled from a command center **200**, which may or may not be geographically proximal to the site where documents are being created and formed into mail pieces. Preferably the command center **200** will be capable of monitoring document production sites at a plurality of remote and local locations. Terminals **201** within the command center **200** allow users to interface with the lifecycle monitoring system through a command intranet **203**. Alternately, a remote terminal **202** may communicate to the command infrastructure **210** through a network **204**, such as the Internet.

The command infrastructure **210** is preferably comprised of a command web server **213** to handle communications and data transfer with remote and local network locations. A command application server **212** includes the computer hardware and software for gathering and presenting the lifecycle information. Gathered mail piece lifecycle data is stored at the command location in the

command database **211,** which is accessed by the command application server **212** for providing lifecycle monitoring information to the terminals **201** and **202.**

For the exemplary embodiment shown in Fig. 2, the command infrastructure **210** is depicted in communication with the mail piece creations system **2** and the corresponding lifecycle stages **10, 20, 30, 40, 50,** and **90** through an Internet network connection **204.** In this example, a site infrastructure **220** for the present invention is located at the site where the documents are being processed by a document factory **240.** The local site also includes a customer computer environment **230,** which interfaces and cooperates with the lifecycle tracking features of the present invention. The particular document factory **240** of this example includes the customer mainframe **241,** which generates the original printstream information. Printstream data from the mainframe **241** may be transmitted to the command application server **212** to allow a virtual image of the document to be generated at the command center **200** for documents that are tracked by the system.

The document factory **240** also includes third party information **242.** Information **242** may include additional information that is to be included with the mail piece, such as that added during a document enhancement stage **20.** Third party information **242** may include identification of inserts, advertisements, or special offers that are intended to be part of the mail piece, but that may not have been generated in the print stream from the legacy mainframe **241.** The third

party information **242** helps to provide complete knowledge about the mail piece tracked by the lifecycle monitoring system **1**.

Data from the MRDF file servers **243** is also preferably gathered as part of the present invention. MRDF stands for Mail Run Data File. The MRDF includes the instructions for assembling the mail pieces in the inserter machine **245**. Each mail piece typically is uniquely identified in the MRDF, and the appropriate instructions for assembling the printed documents with the associated inserts, and generating an appropriate envelope with the appropriate postage is stored in the MRDF file servers **243**. The MRDF Output Files and database also updated to indicate the status of mailpieces within the inserter system, as the MRDF file servers **243** control the creation of the mail pieces. Accordingly, the MRDF files include very useful data for understanding the nature and status of mail pieces in the document production lifecycle.

In accordance with the present invention, the MRDF file servers **243** also store information relating to the separate household communications that may be included in a single mail piece. In addition to the MRDF files, individual communication files are created and stored in parallel.

For example, where communications comprise invoices, "invoice data files" can be created corresponding to individual invoices. The invoice file would include links to both mail run and mail piece information included in the MRDF. The invoice file includes the individual invoice information. Thus, a framework is stored

allowing processing of mail pieces, as well as reporting and tracking for individual invoices.

Preferably, the invoice file is created at the time the MRDF file is created. The invoice file includes the mail piece and mail run identifiers. The inclusion of these identifiers in the invoice file allows the mail piece and mail run information to be accessed based on an invoice query. Preferably the invoice file further includes customer name so that invoices can be tracked by both name and number. Invoices are just one type of communication that might form the individual communications that are included in mail pieces.

In the example of Fig. 2, a printer **240** is also located at the document factory. The printer receives the printstream, often after a document enhancement stage **20**, and prints the thousands of documents that form the customer bills, or other mailing content, as the case may be. Printing is a major step in the document production process. As such, status data for a document within the print stage is important for lifecycle tracking and is preferably provided accordingly.

In addition to the MRDF data discussed above, document status data is gathered directly from the inserter machines **245**. The inserters **245** include sensors and scanners for detecting the status of documents. For example if a document is mishandled or damaged, a record may be made indicating such. Such a record may typically be stored in the MRDF and may also be provided independently to the lifecycle monitoring system. Also, the status of the machine

245 itself is of interest in tracking and monitoring. For example, a delay in machine **245** operation due to mechanical problems may be of interest in lifecycle tracking, although such delay may not be reflected in any files particular to a mail piece.

After a mail piece is assembled in the inserter, it can be sorted for expedited delivery by the delivery service on an outgoing sorter **246**. From the outgoing sorter **246** a scanner may record and provide data as to when sorting is complete, and when the mail piece is sent into the delivery mail stream. Further, an image of the outgoing mail piece may be captured and stored for lifecycle tracking purposes.

Finally, at this exemplary document factory **240**, an incoming sorter **247** senses incoming mail pieces and the document lifecycle monitoring system **1** can relate a code scanned from the incoming mail piece to a particular item of outgoing mail. By relating the outgoing and incoming mail, the communication loop with the customer is completed.

Data from the various components of the data factory **240** are transmitted via the site intranet **225** to the site infrastructure **220.** At the site infrastructure **220**, a universal data handler **221** is capable of handling the diverse types of data to be used for lifecycle monitoring from the varied sources. The site infrastructure also includes a local application server **222**, a database **223** and a web server **224**.

The universal data handler **221** provides the ability to receive document production data from a variety of different sources having different formats, and to ensure that the data is properly processed and streamed to the command infrastructure **210** in the manner desired by users of the lifecycle tracking system **1**. The universal data handler **210** is also capable of handling the high volume of data that is generated in a high volume such as document factory **240**. The universal data handler **210** preferably includes a streaming framework implementing a mechanism to stream events (data) to registered users at the command center **200**.

Fig. 3 provides an exemplary inserter **300**, with accompanying sensors and computer control, as may be used with the present invention. A local computer **310** provides the processing instructions to the inserter system **300** and receives the sensor information from the inserter. In addition to receiving information from sensors mounted in the inserter device **300**, a hand held scanner **321** is connected to the computer **310** and may be used by an operator to scan and identify mail pieces as appropriate. For example, if a mail piece is damaged and must be reprocessed, an operator may use the hand held scanner **321** to identify the piece and make an appropriate notation in the MRDF files.

Within the inserter, a scanner **322** typically identifies the codes marked on documents as they are fed into the inserter system at the input mechanism **301**. The scanner **322** may also check each document as it passes, and compare the

data on the document with data in the corresponding print stream file. From this comparison it may be determined if an error has occurred, and an indication may be provided indicating an error. Using this information, the lifecycle tracking system **1** may indicate corrective action that must be taken.

As discussed previously, a collation chassis **302** collects documents and inserts together, and the collations are stuffed into envelopes in an inserter module. Stuffed envelopes can be metered at a metering module **304**. Such metering activity is in turn monitored and controlled through meter link **323** by local computer **310**. Such metering information is further supplied for lifecycle tracking purposes. A scanner **324** further tracks the progress of documents through the inserter machine by looking for the codes on the documents indicating that the corresponding mail piece has reached the stage at which the scanner **324** is positioned. Scanners **324** may be located at any points within the inserter system **300**. Further inserter processing may be carried out at an edge marking module **305** and a printer **306** for putting delivery information onto the stuffed envelopes. Sensors within those modules communicate with sensor interface **325** to provide machine status and document status information to the local computer **310**. A divert bin **307** collects misprocessed mail pieces. Preferably, sensors indicate when a mail piece is sent to the divert bin, and a record is made that further processing is required. Finally, an output stacker **308**, sorts the finished mail pieces by postal codes in order that the sender may receive postal presorting

discounts. In the preferred embodiment, a camera **326** captures an image of the completed envelope, and such image is associated with the file for the mail piece in the lifecycle monitoring system.

Fig. 4 depicts an exemplary display of document lifecycle tracking information in a preferred format according to the present invention. Screen **400** includes a grid **401** of individual blocks **405** with each block **405** representing one or more mail pieces. In this particular example, the blocks **405** each represent a single mail piece, however by selecting an expanded view via zoom buttons **403** the blocks **405** may represent groups of ten, a hundred, a thousand, or any multiple of mail pieces. By manipulating the zoom buttons **304**, the zoom resolution may be adjusted to any of the different levels of allowed by the system. A grid may be selected to represent the status of the mail pieces in one or more predefined stages in the document production process. Preferably the screen **400** will include an indication of how may mail pieces are represented by each block **405** on the grid **401** in the present view.

Each block **405**, is also preferably color coded in accordance with a legend **402** to indicate the status of the document for a selected process. For example, if a group of mail pieces is being examined for their current print process status, the colors indicate whether or not the document was printed. For an insert process, the colors may indicate whether or not the mail pieces was sensed by an inserter, and where on the inserter it is currently located, and where it was located after

processing. The insert color codes may also indicate whether the particular mail pieces were successfully or unsuccessfully processed. For the sorting process, the colors may indicate whether the mail piece was sorted. For the reply sorting process, colors may indicate whether or not a reply relating to the individual mail piece, such as a payment envelope or a reply card has been received.

If the selected zoom level is such that the blocks **405** represent more than one mail piece, the presence of a "negative" color code will indicate that one or more mail pieces in that group have the negative condition. For example, if a block **405** representing 100 mail pieces is indicated as not having been printed, then the color code represents that within the 100 represented documents, at least one or more has not completed printing.

In menu **404**, a user may select which the particular mail run for which document lifecycle information is desired. This menu **404** may also provide the ability to select data from one of a plurality of remote document factory sites that are monitored by the command infrastructure **210**.

A mail piece finder **407** interface allows an operator to locate a particular mail piece based on a record number piece ID, the name of the recipient, or any other information which may be particular to the mail piece. When one or more mail pieces matching the search criteria is found a list is provided and the grid **401** may zoom in on identified mail pieces. Using menu **406**, a user may select to see

what type of rendered information content will be shown when an individual mail piece **405** is selected.

The display **400**, showing inserter information in accordance with the present invention, reports the status of inserts and document completion processes. Detailed views can indicate the status of inserts and the specific contents of each envelope. Incomplete, lost, and missing document are appropriately flagged via the color codes on the display.

In the preferred embodiment, the mail piece status information shown in Fig. 4 may also be accessed by querying the status of an individual communication, i.e. statement, invoice, etc. Based on the communication data file, the appropriate mail piece is identified, and corresponding status screen is displayed. In particular where household consolidation is used, the ability to view status based on an identifier of the particular communication is desired.

In Fig. 5, screen **500** depicts a further filtering functionality for displaying mail piece lifecycle information. A user may select to apply a filter to display only those mail pieces in grid **401** that include one or more status conditions. Any of the monitored status conditions may be selected. When the filter is applied only mail pieces **405** having the particular status will be displayed. The filter may be activated or deactivated via filter button **501**. Also, when a particular mail piece having an identified condition is selected, an export button **502** may be activated to forward instructions and information about the selected mail piece to a selected

destination. The forwarded instructions and information may activate whatever reprocessing that may be required. Potential export destinations may include a printer, an email, or fax notification to an operator to take action.

In Fig. 6, a preferred display of particularized information regarding an individual mail piece is depicted in accordance with the present invention. When an individual mail piece **405**, or a particular statement or communications, is selected, a mail piece window **601** may appear and provide detailed information about the status and content of the mail piece. In particular, the addressee **602**, return address **603**, postage information **604,** processing data **605** may all be displayed. Document ID, job ID and the document status are indicated in the status bar **607.** The particularized document data is gathered from the plurality of data sources available to the lifecycle tracking system. For example, the image of the envelope in screen **601** may be a virtual representation of what the envelope would look like based on the known printing information from the MRDF and print stream, or the image may be a camera shot of the actual envelope taken at the outgoing sorter. In the preferred embodiment, in addition to showing envelope data, corresponding images of the document (bills, statements, etc.) can be similarly shown. Also, in the preferred embodiment, the information that is particular to a single communication within the mail piece may be accessed.

Fig 7 depicts a screen **700** similar to that of screen **601**. In addition to the detailed information provided by screen **601**, four life cycle stage selection buttons

701, **702**, **703**, and **704** are available to allow the user to select which lifecycle stage for information is desired. The selection of one of the four buttons can result in stage information being provided for the particular selected mail piece, and may also be a means for selecting the stage to view in screen **400**. Exemplary print stage button **701** allows the user to see the status of the single or group of documents during the print stage **30**. Exemplary insert stage button **702** allows the user to see the status of the one or more documents during the insert stage, as depicted in Fig. 4. In Fig. 7, the outgoing sort stage button **703** has been selected and the detailed information on screen **700** is providing the detailed information gathered from the outgoing sort stage. In the preferred embodiment there may be an electronic document presentment button **704** that will provide an electronic rendition of the documents in the mail piece when selected. In the preferred embodiment the electronic rendition is created for on screen presentment by recreating the documents from printstream that corresponds to the mail piece. Software for such document presentment is known in the art, an example of which is the Digital Document Delivery™ system from Pitney Bowes Inc.

The data gathering, monitoring, and presentation system for use in document lifecycle tracking in accordance with the present invention provides the ability to track documents as they pass through an automated document factory, then the postal delivery system and then ultimately on the return path back to the

original mailer. This ability may assist, for example, in efficient and effective management of sales campaigns. Historical data about past mail piece lifecycles makes it possible to project results for present and future campaigns. For instance, if the documents are currently being inserted, then history may show that they are typically delivered in two to four days, and history may further show that orders start to arrive in five to eight days. As the documents pass through the creation, preparation, insertion, sortation, and postal delivery stages, the estimates become more precise and the ranges of uncertainty are reduced. Finally, the actual orders can be tracked from the time that they are mailed back to the arrival at the vendors facility.

An exemplary campaign status can be measures with as much or as little detail as the mailer wishes. Data can be gathered by ZIP code regarding delivery of the mail pieces and the early responses. The present invention provides a useful customer relation management tool for test mailings or comparisons of different marketing strategies that report data virtually in real time. For instance using the present invention it may be found that offer A is resulting in a 15% response from one ZIP code, while offer B is resulting in only a 2% response in that zip code, but is doing very well in a different ZIP code. Changes in marketing approach may be advised to maximize the effectiveness of the campaign.

The system of the present invention can track individual mail pieces in real time and alert users to problems. If a document is damaged and requires

reprinting, a mailer may decide to send a notification, for example by email, to tell the customer that the document will be arriving later than expected.

In the preferred embodiment of the present invention, the communication file, and the MRDF are created during the printstream processing portions **10** and **20** of the mail run process. The communication data file is matched to the MRDF by adding an extension to the MRDF file name. Thus for example, where the individual communications are invoices, then the extension "_inv" may be added to the MRDF file name. Both files are stored in known directories on the MRDF server **243**. When a new set of files are available, they are automatically detected and read into the server database using the data handler **221**.

Each individual communication data file should include a mail piece identification number that links the individual communications to the mail piece. In the MRDF, the mail piece ID is preferably unique to each record. However, in the individual communication records, one or more records may include the same mail piece ID. The remaining fields of the individual communication records and MRDF are application specific, and are not significant to the present invention.

An exemplary MRDF may include the information shown in the following table:

MRDF FILE

File format

#	Name	Type	Start	Length	Description
1	JobID	N	0	9	JobID (2 char Cust, 2 char Job, 2 Char instance, 3 char Julian)
2	Piece ID	N	9	5	Sequence number of collation
3	AccountID	A	14	20	Account Identifier
4	Document Type	A	34	10	Document Type uses letter designation
5	Total Sheets from input	N	44	2	Total sheets from Input
6	Additional sheets for manual	N	46	3	Additional sheets for manual
7	Future Use 2	N	49	7	Future Rat
8	Input Weight	A	56	5	Weight of input sheets Format 0.00
9	Sel Fdr 2	N	61	1	0=No, 1=Yes
10	Sel Fdr 3	N	62	1	0=No, 1=Yes
11	Sel Fdr 4	N	63	1	0=No, 1=Yes
12	Sel Fdr 5	N	64	1	0=No, 1=Yes
13	Sel Fdr 6	N	65	1	0=No, 1=Yes
14	Sel Fdr 7	N	66	1	0=No, 1=Yes
15	Account Pull	N	67	1	0=No, 1=Yes
16	Quality Check	N	68	1	Quality Audit check
17	Accessory Req 1	N	69	1	Zip Mark 0=No, 1=Yes
18	Accessory Req 2	N	70	1	0=No, 1=Yes TBD
19	Accessory Req 3	N	71	1	0=No, 1=Yes TBD
20	Accessory Req 4	N	72	1	0=No, 1=Yes TBD
21	Zip 5	N	73	5	5 digit code
22	Zip 4	N	78	4	4 digit code
23	Zip 2	N	82	2	2 digit
24	Future Use	N	84	16	Future Use for Planet Code
25	Manifest Number	N	100	20	Manifest number
26	Account # for OMS	A	120	20	Account charge back for OMS
27	Sub Account for OMS	A	140	5	Sub Account for OMS

28	Carrier Code	A	145	3	Carrier Code
29	Class code	A	148	3	Class code
30	Invoice number	A	151	20	Invoice number (req. for DFWorks)
31	Name	A	171	70	Customer Name
32	Address line 1	A	241	70	Address line 1
33	Address Line 2	A	311	70	Address Line 2
34	Address Line 3	A	381	70	Address Line 3
35	Address Line 4	A	451	70	Address Line 4
36	Address Line 5	A	521	70	Address Line 5
37	Future Use 6	A	591	420	Return address in future
38	Check Number	N	1011	20	Future Use
39	Check Amount	N	1031	10	Future use
40	Check Account	N	1041	10	Future use
41	Statement Amount	N	1051	15	Statement Amount
42	Invoice Amt	N	1066	15	Invoice Amt
43	Total Images	N	1081	5	Total Images for this customer
44	Total Postage	N	1086	5	Total Postage from Mailers choice
45	Customer Pass thru	A	1091	40	Customer pass thru
46	Key line	A	1131	40	Manifest key line
47	Endorsement	A	1171	40	Endorsement Line
48	Received File From Customer	A	1211	12	Time received YYYYMMDDhhmm
49	810 Job Name	A	1223	10	810 Job Name
50	Carrier Route	A	1233	4	Carrier route #
51	FIPS Code	A	1237	6	FIPS code
52	Finalist Error code	A	1243	5	Finalist Error code
53	Address change flag	A	1248	1	Address changed flag 0=no, 1-yes
54	Mailpiece Unit ID	A	1249	5	Mailpiece Unit ID
55	Tray number	A	1254	3	Tray Number
56	Record Offset	A	1257	8	For reprints
57	Total Records	A	1265	8	For Reprints
58	Work order number	A	1273	20	Work order number
59	Pad	A	1293	7	Pad

60	End of record	A	1300	1	CR/LF

In the columns of this table, the various types of MRDF data are described. The "Type" column indicates whether the data is a number ,"N," or alphanumeric, "A." The "Start" column indicates the position within the file at which the particular information begins. The "Length" column indicates the length of the data field.

The "JobID" data element indicates the mail run job that the mail piece belongs to. Typically thousands of mail pieces will have the same JobID. Mail pieces with the same JobID will be processed together as a group. Another significant data element is the "PieceID." The PieceID is the identifier for the individual mail piece in the mail run. If householding is being used, a mail piece with a single PieceID may include more than one statement or invoice to the same address. Other data elements are self-explanatory and include data about the mail piece, or instructions on how to assemble the mail piece. For example the items named "Sel Fdr" are binary instructions to an inserter feeder on whether or not to feed an insert from that feeder while collating the documents for the mail piece. Address, postage, and carrier information is also included in the MRDF file.

It is desirable that all of the MRDF data be available for a query in connection with an individual communication. However, it is not necessary that the individual communication data file include all of the same information as the MRDF. Rather, a reference to the "PieceID" in the communication data file, allows

the corresponding information in the MRDF to be accessed. Accordingly, the following table is an exemplary communication data file for a case where the communications are comprised of invoices.

Invoice Data File					
#	Name	Type	Start	Length	Description
1	Invoice Number	**N**	0	9	Invoice Number
2	Piece ID	**N**	9	5	Sequence number of collation
3	Invoice Amt	**N**	14	15	Invoice Amt
4	810 Job Name	**A**	29	10	810 Job Name
5	Work Order	**A**	49	20	Mailpiece Unit ID
6	Document Type	**A**	79	10	Document Type (Acknowledgments, Standard Invoices, Exchanges, Consolidated Invoices and Relationship Acknowledgments)
7	Number of Sheets	**N**	89	3	Number of Sheets in Invoice
8	Number of Images	**N**	92	5	Number of total images in Invoices

In this example, the data field "Invoice Number" identifies the individual communication. Further information that is specific to the individual invoice such as "Invoice Amt" and "Number of Sheets" is further included in this file. Importantly the "PieceID" data field is included in the invoice data in order that the exemplary MRDF data file described above may be accessed, and the corresponding data be related to the individual invoice.

Fig. 8 depicts an exemplary report that may be generated based on a search of invoice data. For this example, it is desirable that delivery verification be performed for an individual invoice that the user has a question about, as opposed to the mail piece, which may include more than one invoice. Fields **801-804** include parameters of a search for invoice data. The invoice field **802** indicates the identification number for the individual invoice communication for which information is desired. Accordingly, based on the selected information report **805** is displayed with the information designated for this particular report.

Although the invention has been described with respect to a preferred embodiment thereof, it will be understood by those skilled in the art that the foregoing and various other changes, omissions and deviations in the form and detail thereof may be made without departing from the scope of this invention, as further described in the following claims.